

Tackling Challenges to Implementation of Hydrogen Energy Systems

The National
Hydrogen
Association
March 30, 2009



Our Sponsor

Our sponsor:

U.S. DOE Office of Hydrogen, Fuel
Cells and Infrastructure Technologies



U.S. DEPARTMENT OF
ENERGY

Welcome!

- Introductions
- Review Agenda
- Attendee List
- Announcements

Workshop Purpose

- Understand the latest thinking and advances on three key topic areas
- Facilitate an interactive dialog among hydrogen energy stakeholders on key technical issues
- Provide input to developing codes and standards.

Agenda

- Welcome & Introductions: Karen Hall – The National Hydrogen Association
- Odorants and Sensors: Chair: Bob Boyd – The Linde Group
- Separation Distances: Chair: Karen Hall - NHA
- Indoor Fueling: Chair: Antonio Ruiz - US Department of Energy, invited
- Closing Remarks: Karen Hall - NHA

Objectives

- Understand the circumstances under which an odorant might be used for hydrogen.
- Learn about new requirements for hydrogen detectors and a world class test facility for hydrogen sensors.
- Discover new tools and data available on hydrogen releases.
- Input into the developing data for liquid hydrogen releases and pools.
- Share lessons learned on permitting indoor operations and indoor hydrogen fuelling.

Share Data and Experiences

- Research and technical validation activities are important to ensure developing codes & standards are scientifically supported.
- Results and conclusions are discussed among stakeholders.
 - Workshop provides an opportunity for healthy scientific debate on selected issues.

Odorants and Sensors

- **Chair: Bob Boyd – The Linde Group**
- *Development and Compliance to Hydrogen Sensor Codes and Standards*
William Buttner, Ph.D. - Senior Scientist I, National Renewable Energy Laboratory
- *Odorization of Hydrogen for Fuel Leak Detection*
Michael Sprague - Managing Partner, Enersol Inc.
Patrick Flynn - Managing Partner, Enersol Inc.
- *Uncertainty Associated with Hydrogen Detection Instruments*
Allan Coutts - Washington Safety Management Solutions LLC
- *Wide Range Hydrogen Specific Sensors for Industrial Safety*
Prabhu Soundarrajan, H2Scan Corporation – invited

Separation Distances

- **Chair: Karen Hall – NHA**
- *Evaluation of Barrier Walls for Mitigation of Unintended Releases of Hydrogen*
William Houf, Ph.D. - Sandia National Laboratories
- *Results from an Analytical Investigation of Small-Scale Releases from Liquid Hydrogen Storage Systems*
William Winters, Ph.D. - Sandia National Laboratories

Indoor Fueling

- **Chair: Antonio Ruiz – US DOE**
- *Code Compliance Analysis for Indoor Hydrogen Fueling*
Carl Rivkin - National Renewable Energy Laboratory
- *Linde Fueling Protocol for indoor fueling of fork lift fleets fueling inside large warehouse distribution centers*
Mike Ciotti – The Linde Group
- *Safety Features of indoor fueling*
Dave Farese - Air Products & Chemicals